It was found by a practical optician to be impossible to work glasses on a cone of large diameter, consequently a conical tool was constructed with an angle of 45° at the apex, and 8 inches diameter at the base.

A glass about 4 inches long was ground on the sides of this near the base, and as the resulting lens if ground on plane glass would have been too concave for most purposes, the outer side of the glass was previously ground to a convex cylindrical curve, and its axis applied parallel to the generating line of the cone in the plane of the axis of the cone.

The result was concavo-convex cylinders of varying power suitable for the practical measurement of astigmatism.

Lenses were exhibited varying from 0 to – 6DCy, and from 0 to + 6DCy.

III. "On the Action of the Excised Mammalian Heart." By Augustus Waller, M.D., and E. Waymouth Reid, M.B. Communicated by Prof. Burdon Sanderson, F.R.S. Received November 18, 1886.

(Abstract.)

The graphic method, the galvanometer, and the capillary electrometer were made use of in this research. The animals used were the dog, rabbit, cat, rat, guinea-pig, and sheep. The chief results were as follows:—

1. Spontaneous ventricular contractions, complete and capable of being recorded, continue after excision of the heart for periods which are variable, but which as a rule are longer than has generally been received to be the case (Czermak and Piotrowsky).

2. Spontaneous ventricular contractions frequently outlast auricular contractions, both spontaneous and excited.

3. After spontaneous ventricular contractions have ceased to occur, electrical and mechanical excitations can still provoke contraction.

4. The length of contraction of both auricle and ventricle of the excised heart is very great (15 to 20 times the normal duration), whether the contraction be spontaneous or excited.

5. The length of the latent period increases with the length of contraction; it may be as long as 0·75 sec.

6. These phenomena (4 and 5) depend principally upon the surrounding temperature.

7. The heart (of a rabbit) can regain its excitability and its power of spontaneous contraction after it has been frozen hard.

8. In an excited beat, in ventricle or auricle, of an excised heart, all parts are not in action simultaneously.

9. An excited contraction starts from the point excited—from the base if the base is stimulated—from the apex if the apex is stimulated.

10. The excited contraction travels from its point of origin, indifferently in any direction in the substance of the ventricle.

11. The rate of the wave of contraction measured by the graphic method varies, according to the temperature and state of the heart, from 3 to 85 cm. per second.

12. The velocity is (*cæteris paribus*) greater in the hearts of large than in the hearts of small animals.

13. In spontaneous contractions of the ventricle the movement of the apex appears to precede that of the base.

Note.—We have followed the wave of both spontaneous and excited contraction of the frog's ventricle by the graphic method, and measured its rate. The rate is from 40 to 80 mm. per second. In spontaneous contraction, the movement of the base precedes that of the apex.

14. All parts of the uninjured heart are iso-electric; the apex, however, is often slightly negative to the base.

15. The electrical variation of spontaneous contraction is sometimes diphasic (corresponding to the double variation of the beat of the frog's heart), sometimes monophasic.

16. Electrical variations can be detected after visible contractions have ceased.

17. The direction of the electrical current follows no definite rule in our observations, negativity of apex preceding sometimes negativity of base, at other times the reverse taking place.

18. The diphasic variation of excited contractions indicates that the part stimulated is first negative then positive to other parts.

19. Under conditions of lowered excitability a weak excitation will give a monophasic, a strong excitation a diphasic variation.

20. Towards the close of the period of excitability, the variation of the excited beat is single. It is less frequently single at the outset of experiment.

21. When excitatory variations can no longer be obtained, injury will produce a change of electrical state indicating negativity of the part injured.